What is claimed is:

1. A method of mapping a pathway of differentiation of a population of embryonic cells, comprising:

(i) selecting: (a) a set of gene expression products, wherein each gene expression product in the set is characteristic of a cell type that has undergone differentiation, such that a plurality of differentiated cell types are represented in the set; and (b) an exogenous factor from a library of exogenous factors;

(ii) applying the exogenous factor to the population of embryonic cells;

(iii) characterizing the effect of the exogenous factor on the differentiation pathway of the population of cells by determining gene expression products in the set; and

(iv) mapping the pathway of differentiation of the cells.

2. A method according to claim 1, wherein the set of expression products comprises at least one gene expression product that is expressed in a tissue selected from the mesoderm, ectoderm and endoderm.

3. A method according to claim 1, wherein the set of expression products, comprises: at least one gene expression product expressed in the ectoderm, at least one gene expression product expressed in the mesoderm and at least one gene expression product expressed in the endoderm.

4. A method according to claim 2 or 3, wherein the at least one gene expression product expressed in the ectoderm includes any of the group consisting of NF-H, keratin and adrenal DβH.

5. A method according to claim 2 or 3, wherein the at least one gene expression product expressed in the mesoderm includes any of the group consisting of enolase, renin, CMP, kallikrein, WTI, cACT, δ-globulin and β-globulin.

6. A method according to claim 2 or 3, wherein the at least one gene expression product expressed in the endoderm includes any of the group consisting of albumin, α1AT, amylase, PDX-1, insulin and αFP.

7. A method according to claim 1, wherein the exogenous factor is selected from a group consisting of interleukins, bFGF, TGFβ1, activin-A, BMP-4, HGF, EGF, βNGF and retinoic acid.

8. A method of directing differentiation of human embryonic cells to a specific cell type, comprising:

a. permitting a population of embryonic stem cells to form embryoid bodies;

b. dissociating the embryoid bodies to provide embryonic cells for differentiating in the presence of at least one exogenous factor for an effective period of time; and

c. causing directed differentiation of human embryonic cells to form the specific cell type

9. A method according to claim 8, wherein the embryoid bodies are formed in a suspension culture.

10. A method according to claim 8, wherein the embryonic cells are monolayer cultures.

11. A method according to claim 8, wherein the exogenous factor is a growth factor.

12. A method according to claim 8, wherein the exogenous factor is an interleukin.

13. A method according to claim 11, wherein the exogenous factor is nerve growth factor.

14. A method according to claim 8, wherein the exogenous factor is retinoic acid.

15. A method according to claim 8, wherein the differentiated cells are neuronal cell type.

16. A method according to claim 15, wherein the differentiated cells have neuronal processes.

17. A method according to claim 1, wherein the embryonic cells are human embryonic cells.

18. A method of treating a subject suffering from a condition associated with degeneration of cells or malfunction of cells, comprising:

a. accessing human embryoid body dissociated cells;

b. treating the cells with an exogenous factor;

c. causing the cells to differentiate; and

d. placing an effective amount of differentiated cells into the subject to treat the condition.

19. A method according to claim 18, wherein the condition is a heart condition in which heart muscle is degenerated.

20. A method according to claim 19, wherein the cells are treated with at least one exogenous factor selected from the group consisting of TGF-β, FGF, RA, HGF and EGF.

21. A method according to claim 18, wherein the condition is a kidney condition in which kidney tissue is degenerated.

22. A method according to claim 21, wherein the cells are treated with NGF.

23. A method according to claim 18, wherein the condition is a skin condition in which skin tissue is degenerated.

24. A method according to claim 23, wherein the cells are treated with BMP-4.

25. A method according to claim 18, wherein the condition is a liver condition in which liver tissue is degenerated.

26. A method according to claim 25, wherein the cells are treated with NGF.

27. A method according to claim 18, wherein the condition is a brain condition in which brain tissue is degenerated.

28. A method according to claim 27, wherein the cells are treated with at least one of NGF or RA.

29. A method according to claim 18, wherein the condition is a spinal cord injury in which neurons are degenerated.

30. A method according to claim 29, wherein the cells are treated with at least one of NGF or RA.

31. A method according to claim 18, wherein the condition is anemia or immunodeficiency.

32. A method according to claim 18, wherein the cells are treated with at least one of NGF or interleukin.

33. A method according to claim 18, wherein the condition is an adrenal condition in which adrenal tissue is degenerated.

34. A method according to claim 33, wherein the cells are treated with RA.

35. A method according to claim 18, wherein the subject is a human subject.

36. A method according to claim 18, wherein the subject is a mammal.

37. A method according to claim 18, wherein the selected cell type may be any of brain cells, liver cells, pancreatic cells, muscle cells, chondrocytes, kidney cells, Mullerian duct cells, heart cells, blood cells, skin cells and adrenal cells.

38. A kit for determining differentiation pathways, comprising:

(a) a plurality of sets of cell specific markers forming a panel in an assay format, the assay format including reagents for detecting the cell specific markers, the cell specific markers including a first set of markers that are characteristic of each of the ectoderm, mesoderm and endoderm of the embryo, and a second set of markers that are characteristic of a body tissue, the second set containing more than one marker; and

(b) means for detecting reagents bound to cell specific markers.

39. A kit according to claim 38, wherein the reagents are selected from DNA primers

and antibodies.

40. A method according to claim 38, wherein the means for detecting reagents bound to cell specific markers is selected form a gel based system, an immune detection assay and a solid chemistry assay.

41. A method for screening an exogenous factor to determine whether the factor is capable of causing directed differentiation in a population of human embryonic cells, comprising:

(a) subjecting the population of cells to the exogenous growth factor;

(b) measuring the expression of receptors, the receptors being of a type that characterizes a particular differentiated cell population; and

(c) determining whether the exogenous factor enhances differentiation, maintains differentiation at a normal level or inhibits differentiation of the cell population.

42. A panel of cell type differentiation determining markers, comprising: a set of reagents for specifically detecting gene expression of a plurality of ectodermal specific proteins, a plurality of mesodermal specific proteins and a plurality of endodermal specific proteins.

43. A panel according to claim 40, wherein the ectodermal specific proteins, further comprise: proteins selected from the group consisting of : neurofilament protein, keratin and adrenal dopamine β hydroxylase.

44. A panel according to claim 40, wherein the mesodermal specific proteins, further comprise: proteins selected from the group consisting of enolase, CMP, renin, kallikrein, WTI, cACT, β globin, δ globin and cActin.

45. A panel according to claim 40, wherein the endodermal specific proteins further comprise: proteins selected from the group consisting of amylase, α-FP, PDX-1 and insulin.

46. A panel according to claim 40, wherein the reagents are DNA primers.

47. A panel according to claim 40, wherein the reagents are antibodies.

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